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## Heart Transplants a Help, But Prevention Is Better

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EXPERIMENTS on heart disease evoke a spasm of public interest when transplants and mechanical hearts hit the headlines. These dramatic events are nevertheless almost the least important facet of the research efforts mobilized in the last two decades, to a very large extent under the impetus of the National Institutes of Health.

During this period, the concept of heart disease has gradually changed from the diffuse idea that it is an inevitable companion of the deterioration of aging. It is beginning to be understood with much greater specificity as a family of diseases with roots in metabolism, diet, emotional stress, genetic predispositions and environmental insults.

There can be little question but that the anticipation and prevention of heart disease (and of diseases of the whole circulatory system) will have a payoff hundreds or thousands of times that of the most optimistic goals of transplants or machines.

THIS IS NOT to criticize the strong efforts now being made in those directions, however. Heart transplants are a dubious approach to treatment in any general way, if only because of the impossible problem of arranging and allocating the supply of donors. But they open the door to important avenues of research, or at least may be expected to when the limelight dims.

The machines offer a brighter long-term prospect, and are bound to have a very broad market even if mainly as a backup to deeper advances in the prevention of heart disease. Whatever else may be said about Dr. Denton Cooley's recent unsuccessful trial, it clearly demonstrated how the possibility of a transplant could be used as ethically necessary justification for trials with mechanical hearts while they are being perfected.

The geography of heart disease is one of several

promising avenues of research. Experimental models of chronic disease in animals are generally much less relevant than are examples of acute infections. Animals do not often match men in their habits or diets, not to mention their genes, and these factors are already known to be of central importance.

SO WE find out what we can from the distribution of disease as we find it. This approach has been invaluable in medical history, for example, in relating typhoid fever to contaminated water supplies and lung cancer to cigarette smoking.

The present picture could hardly be more confusing. Persuasive arguments can be found which relate many different environmental factors to heart and arterial disease. These include dietary fats, sucrose (perhaps together with chromium deficiency), cadmium (as a contaminant of water or beer or in the atmosphere) and even moderate excesses of salt intake. None of these factors should be discounted, and if any or all of them are operative, they undoubtedly interact as well with other factors of environment, the tempo of daily life and individuality of temperament and heredity.

This list now also includes soft water, according to studies in Britain that have recently been reinforced in Canada, according to an article in the current issue of the New England Journal of Medicine by Drs. T. W. Anderson, W. H. le Riche and J. S. MacKay of the University of Toronto.

They found a rate of fatal coronary disease almost 20 per cent higher in soft-water than in hard-water districts. The British work found that the most plausible common factor was a protective action of high levels of calcium, the chief agent of water "hardness" and a necessary dietary element.

OTHER STUDIES however, have failed to correlate the overall rate of heart

disease with water hardness. The Toronto group therefore suggests that water hardness is less a protective factor against the basic disease than against sudden death in response to a "heart attack." They support this argument with statistics indicating that the soft-water districts showed a much larger proportion of cardiac deaths with a coroner's certificate (obligatory if death is sudden).

They point out that calcium plays an important role in stabilizing the function of the heart muscle, and that liability to sudden death may then be a hazard of dietary deficiency in calcium. It is possible, in principle, to obtain a significant part of the total calcium requirement from hard water if it is not furnished in the rest of the diet, as may often be the case.

Since we are dealing with lifelong influences on metabolism, we also have to investigate how the body's ability to stabilize the level of calcium in the blood is influenced by dietary history. It has not yet been established, in fact, whether this is correlated with calcium in the water supply.

Until this work, it had been a matter of pride in a community to point to how soft its water was. If this work holds up, it may point to one advantage to the general introduction of synthetic detergents whose usefulness for laundering is not impaired by water hardness.

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